



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/652,097	08/31/2000	Mark Richard Shaw	13DV13495	2850
29399	7590	12/04/2003		EXAMINER
JOHN S. BEULICK C/O ARMSTRONG TEASDALE LLP ONE METROPOLITAN SQUARE SUITE 2600 ST. LOUIS, MO 63102-2740			STEVENS, THOMAS H	
			ART UNIT	PAPER NUMBER
			2123	
			DATE MAILED: 12/04/2003	
			5	

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/652,097	SHAW ET AL.	
	Examiner	Art Unit	
	Thomas H. Stevens	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 31 August 2000.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-19 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2,4</u> .	6) <input type="checkbox"/> Other: _____

Art Unit: 2123

DETAILED ACTION

Drawings

1. New corrected drawings are required in this application because figures 1 and 2 are ubiquitous within the industry, thus considered prior art. For example, figure 1 is disclosed in the specification as "typically located in various locations within and around the engine" (pg 1., lines 10-11). Figure 2 is disclosed as in the information discloser statement as prior art (Meyer et al. US 5,611,577, front page).

Information Disclosure Statement

2. The information disclosure statement filed 31 August 2000 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 for the following reasons:

- Apparatus for Making a Solid Three-Dimensional Article from A Liquid Medium by Heller et al.* Enclosed art has little relevance to testing or simulation.
- Method of Making a Solid Three-Dimensional Article from a Liquid Medium by Heller et al.* Enclosed art has little relevance to testing or simulation.
- Compliance Adjustment of a Metal Bellows Actuator by Control Law Parameters by Prelle et al.* Publishing date of 2001 is after the filing date. Need clarification.

Art Unit: 2123

It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Claim Rejections - 35 USC § 101

4. The following is a quotation from 35 U.S.C. 101 which reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-2 are rejected under 35 U.S.C. 101 because the claimed invention is directed to a mathematical algorithm. The examiner respectfully submits that the applicants have not claimed a practical application. An invention which is eligible for patenting under 35 U.S.C. § 101 is in the "useful arts" when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. The fundamental test for patent eligibility is thus to determine whether the claimed invention produces a "useful, concrete and tangible result." The test for practical application as applied by the examiner involves the determination of the following factors:

Art Unit: 2123

(1) "Useful" - The Supreme Court in *Diamond v. Diehr* requires that the examiner look at the claimed invention as a whole and compare any asserted utility with the claimed invention to determine whether the asserted utility is accomplished. Applying utility case law the examiner will note that:

- (a) the utility need not be expressly recited in the claims, rather it may be inferred.
- (b) if the utility is not asserted in the written description, then it must be well established.

(2) "Tangible" - Applying *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefore, is nonstatutory under 35 U.S.C. § 101. In *Warmerdam* the abstract idea of a data structure became capable of producing a useful result when it was fixed in a tangible medium, which enabled its functionality to be realized.

(3) "Concrete" - Another consideration is whether the invention produces a "concrete" result. Usually, this question arises when a result cannot be assured. An appropriate rejection under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as intended without undue experimentation.

The examiner respectfully submits, under current PTO practice, that the claimed invention does not recite a tangible or concrete result. The claims are not tangible because they appear to recite a mathematical algorithm (because no patentable weight has been provided to the preamble);--namely using known equations in the realm of stress analysis of a materials and thus is confining or limiting space that doesn't have specific preprocessing or post solution activity.

Claim Rejections - 35 USC § 112

6. Claims 1-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Art Unit: 2123

The following claimed features have not been disclosed is sufficient detail in the specification:

- Predicting natural frequency (claim 1)—What is the process?
- Stiffness multiplier (claim 1)—Is not defined.
- Using the determined stiffness multiplier in a model to predict a natural frequency response (claim 1)—What is the process of determining the stiffness multiplier?
- Technique to determine the stiffness multiplier (claim 5)—What is the technique?
- Determining system stiffness as a function of the stiffness multiplier (claim 6)—How is it done?
- The stiffness multiplier is used to determine the natural frequency response (claim 8)—How is it done?
- The stiffness multiplier is determined using a regression technique (claim 13)—How is it done and why?
- Configure to determine the stiffness multiplier from input values (claim 15)—What are the input values?
- Multiplier determines using a regression technique (claim 18)—What is the regression technique?
- Technique comprises a regression equation (claim 19)—What and where is the regression equation?

Art Unit: 2123

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

8. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Claims 1, 15 and 18:** Stiffness multiplier is undefined.
- Claims 2, 16 and 17:** What are the dynamic system operating inputs?
- Claim 3:** What is a vibratory environment?
- Claim 4:** "...Inputting geometry inputs including..." What are the standard or required geometry inputs?
- Claims 5 and 19:** Regression techniques—steps are not recited.
- Claim 6:** The examiner fails to understand the purpose of this claim. If claim 5, for example, is to find the stiffness multiplier, isn't it inherent that one has found the stiffness of the system?
- Claim 7:** No transitional phrase. The following is statement regarding preambles: The transitional phrases "comprising", "consisting essentially of" and "consisting of" define the scope of a claim with respect to what unrecited additional components or steps, if any, are excluded from the scope of the claim. The transitional term "comprising", which is synonymous with "including," "containing," or "characterized by," is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., Genentech, Inc. v. Chiron Corp., 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997) ("Comprising" is a term of art used in claim language which means that the

Art Unit: 2123

named elements are essential, but other elements may be added and still form a construct within the scope of the claim.); Moleculon Research Corp. v. CBS, Inc., 793 F.2d 1261, 229 USPQ 805 (Fed. Cir. 1986); In re Baxter, 656 F.2d 679, 686, 210 USPQ 795, 803 (CCPA 1981); Ex parte Davis, 80 USPQ 448, 450 (Bd. App. 1948) ("comprising" leaves "the claim open for the inclusion of unspecified ingredients even in major amounts"). The transitional phrase "consisting of" excludes any element, step, or ingredient not specified in the claim. In re Gray, 53 F.2d 520, 11 USPQ 255 (CCPA 1931); Ex parte Davis, 80 USPQ 448, 450 (Bd. App. 1948) ("consisting of" defined as "closing the claim to the inclusion of materials other than those recited except for impurities ordinarily associated therewith."). A claim which depends from a claim which "consists of" the recited elements or steps cannot add an element or step. When the phrase "consists of" appears in a clause of the body of a claim, rather than immediately following the preamble, it limits only the element set forth in that clause; other elements are not excluded from the claim as a whole. Mannesmann Demag Corp. v. Engineered Metal Products Co., 793 F.2d 1279, 230 USPQ 45 (Fed. Cir. 1986). The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention. In re Herz, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in original) (Prior art hydraulic fluid required a dispersant which appellants argued was excluded from claims limited to a functional fluid "consisting essentially of" certain components. In finding the claims did not exclude the prior art dispersant, the court noted that appellants' specification indicated the claimed composition can contain any well-known additive such as a dispersant, and there was no evidence that the presence of a dispersant would materially affect the basic and novel characteristic of the claimed invention. Therefore, it is impossible to determine wherein the preamble ends and the limitations begin. Thus, a proper search cannot be carried out. See In re Steele, 305 F.2d 859, 134 USPQ 292 (CCPA 1962); Ex parte Brummer, 12 USPQ 2d, page 1654; and also In re Wilson, 424 F.2d 1382, 165 USPQ 494 (CCPA 1970).

Art Unit: 2123

However, in the interest of compact prosecution, the art will be applied to these claims regardless. The dependent claims inherit the defect.

Claim Interpretation

9. Office personnel are to give claims their "**broadest reasonable interpretation**" in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551(CCPA 1969). See *also *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322(Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process. The examiner interprets the invention as a method or process of applying arithmetic equations to determine the frequency response. See *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962); *Ex parte Brummer*, 12 USPQ 2d, page 1654; and also *In re Wilson*, 424 F.2d 1382, 165 USPQ 494 (CCPA 1970). However, in the

Art Unit: 2123

interest of compact prosecution, art will be applied to these claims regardless. It is difficult to understand the claims due to the 101 and 112 rejections.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Algor's ALG/NASTAN™ (Software, See *In re Epstein*)¹ core package capabilities. Algor's core packages are a complete ALG/ NASTRAN™ solution for static stress with linear material models; natural frequency (modal), critical buckling load and steady-state heat transfer analysis (page 1 of 7, lines 1-3).

Static stress analysis capabilities include the use of linear material models, weight, center of gravity and mass moment of inertia analysis and linear contact. Natural frequency (modal) analysis determines a part's natural frequencies and mode shapes. Critical buckling load analysis examines the geometric stability of models under primarily axial load. Heat transfer capabilities solve linear and nonlinear thermal designs by considering conduction, convection, heat flux, heat generation and radiation in steady-state analyses.

Art Unit: 2123

Summarily, other features significance relative to the application is as follows:

Meshing: Automatic solid FEA mesh generation using brick (eight- or 20-node), tetrahedral (four- or 10-node) or hybrid (combines bricks on model surface with tetrahedral elements on the inside) meshing with built-in aspect ratio checking
(Meshing, page 2 of 7, bullet 6)

Loading and Constraints (Loading: page 3 of 7, bullets 10-12; page 4 of 7, bullets 5-8)

- Prescribed rotations
- Surface prescribed rotations
- Edge prescribed rotations
- Variable-stiffness off-axis constraints
- Variable-stiffness off-axis surface constraints
- Variable-stiffness off-axis edge constraints.

Solver Options: Ability to specify choice of ALGOR™ or NASTRAN™ solver
(Solver Options: page 4 of 7, bullet 1)

Results Evaluation: (Results Evaluation: page 4 of 7, bullets 1 and 9)

- Capability to import results data from NASTRAN™ output files (.op2)
- Result contours of:
 - Displacement
 - Stress
 - Strain
 - Vector plots of principal stress directions
 - Static temperature distribution
 - Static heat flow

¹ <http://www.algor.com/products/ALGNAS1735/default.asp> (1994 ;See In re Epstein) pg. 1-7
(printed)

Art Unit: 2123

- o Static heat flux

ELEMENT LIBRARY:(Page (3 of 7), bullets 1-15)

- Spring element
- 2-D element
- 3-D truss element
- 3-D beam element
- 3-D membrane plane stress element
- 3-D plate element
- 3-D brick element
- 3-D tetrahedral element
- Gap element
- Cable element
- Thermal 2-D element
- Thermal rod element
- Thermal plate element
- Thermal brick element
- Thermal tetrahedral element

Results Presentation: (Results Presentation: page 5 of 7, bullet 1) Capability to export results data from ALGOR™ analyses to NASTRAN™.

Art Unit: 2123

Claim Rejections - 35 USC § 103

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over by (Algor's ALG/NASTAN™ (Software)¹ in view of applicants own admission. Algor's ALG/NASTAN™ (Software 1994) teaches what was previously stated in the previous rejection (102(b)); however the cited art does not disclose the intended use, namely modeling of the shrouded bellows component.

¹ <http://www.algor.com/products/ALGNAS1735/default.asp> pg. 1-7 (1994) See *In re Epstein*

Art Unit: 2123

One of ordinary skill in the art, at the time of invention, would apply the ALG/NASTAN™ software package to shrouded bellows because the applicants have admitted that shrouded bellows are typically located around various locations within and around an engine (pg. 1, lines 10-11) and modeling the system would be practical. It would make sense use modeling techniques to predict natural frequency responses in the ducting systems including the shrouded bellows components and associated hardware to withstand High Cycle Fatigue stresses (page 1, lines 10-15).

Correspondence Information

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Stevens whose telephone number is (703) 305-0365, Monday-Friday (8:00 am- 4:30 pm) or contact Supervisor Mr. Kevin Teska at (703) 305-9704.

Any inquires of general nature or relating to the status of this application should be directed to the Group receptionist whose phone number is (703) 305-3900.

November 28, 2003

THS
THS


HUGH JONES, Ph.D.
PRIMARY PATENT EXAMINER
TECHNOLOGY CENTER 4100